

Danalyzer Gas Chromatograph Brochure



Analytical solutions for a global market

For more than 75 years, Daniel Measurement & Control, Inc. has served the oil and gas industries with natural gas and liquid flow measurement products, systems, and services. As a company recognized around the world for delivering advanced solutions, Daniel is synonymous with quality products, industry expertise, and reliable and innovative engineering.

Measurement at its best

We help our customers meet their business objectives by providing excellent service and solutions that reduce maintenance costs, increase availability, and, ultimately, allow engineers and technicians to focus on areas other than their Daniel Measurement and Control products.

As part of Emerson Process Management, Daniel designs and builds its product solutions for a global market. Our financial strength enables us to continuously test the boundaries of current technology, but it is our commitment our customers' success that truly motivates us towards ongoing innovation.

The Danalyzer Difference

Daniel pioneered the use of online gas chromatographs for the natural gas industry over 25 years ago. The Danalyzer's reliable performance has made it the industry standard for natural gas analysis. This performance is based off of a number of key technology differences that are found in all of our gas chromatographs.



Airless ovens

- Integrates the detector, columns, and analytical valves in a single, temperature-controlled assembly
- Enables the analyzer to be mounted in the field without the need for elaborate weather protection or instrument air



Gas chromatograph valves

- Comes with a lifetime warranty
- Choice of 6-port and 10-port pneumatic diaphragm valves for application flexibility
- Simple, easy-to-assemble mechanical design
- Sample does not come into contact with internal moving parts
- More than 250,000 operations per valve between recommended diaphragm replacements



Gas chromatograph detectors

- Multiple detector options
- TCD is sensitive down to three ppm
- Micro-FID is sensitive down to the ppb level for hydrocarbon compounds
- FPD is sensitive down to the ppb level for sulfur compounds
- Dual TCD/TCD or TCD/FID configurations are possible



Environmental chamber testing

- We offer a free, 24-hour environmental chamber test for every GC we manufacture
- Chamber-tested GCs must operate to specification in temperatures cycling between 0° and 130 °F (-18° and 54 °C) for a minimum of 24 hours

The Leader in Gas Chromatograph Technology

The Daniel[®] Danalyzer[™] family of gas chromatographs has defined industry standards by offering accurate, online analysis of natural gas with decades of experience providing robust and reliable measurements in the field. Whether the analysis is the heating value measurement, trace contaminant monitoring, pipeline integrity, or product quality, Danalyzer online gas chromatographs have the proven capability for these measurements.

Danalyzer gas chromatographs have established their place in the industry by offering low cost of ownership. Due to the analyzer's ability to be field-mountable without sacrificing precision or reliability, the gas measurement can be made at or near the sample point — greatly reducing such expenses as shelters, air conditioning, heating, and long/heated sample lines. Furthermore, Danalyzer gas chromatographs are designed to operate for long periods of time without adjustment. When adjustments are required, all components are easily accessible and can be performed in the field in minutes. Many adjustments can even be made remotely via a PC workstation communicating over a modem.



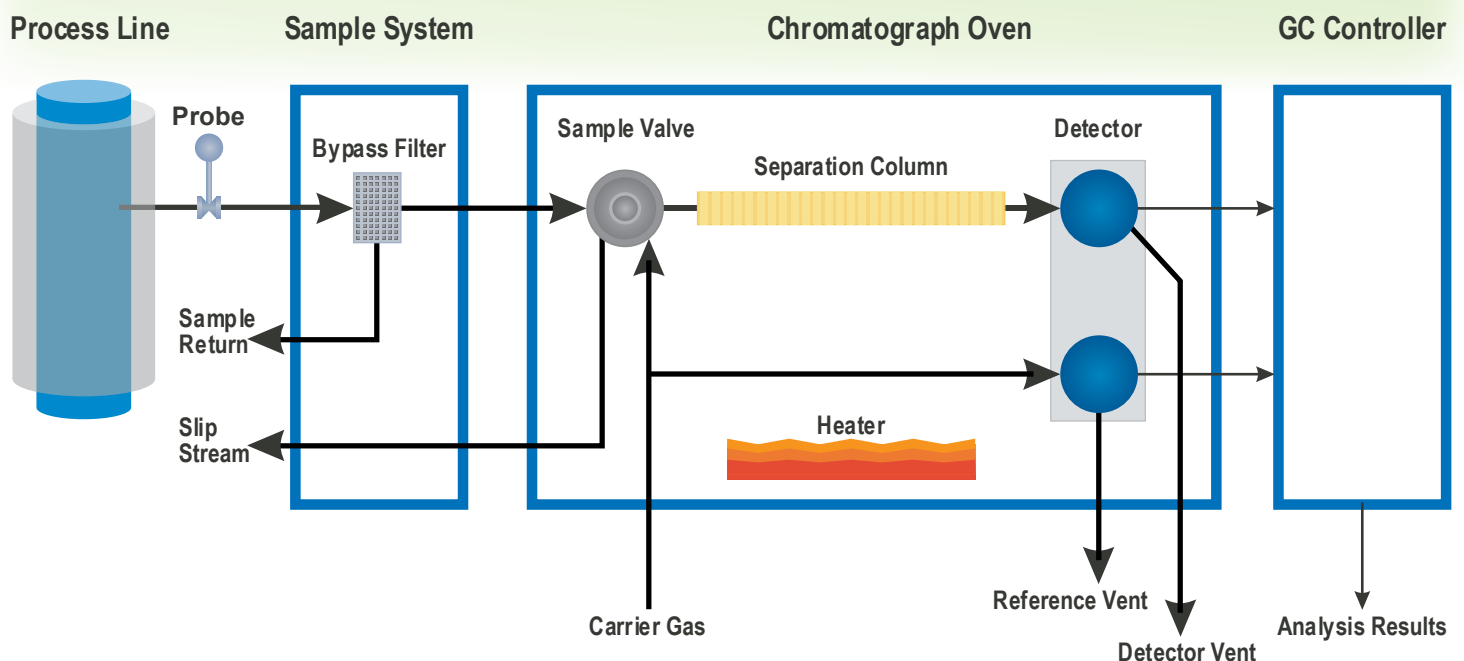
How gas chromatographs work

Gas chromatography is the separation of a mixture of chemical compounds due to their different migration rates through a chromatograph column. This separates the compounds by boiling point differences, polarity differences, or differences in molecular size.

The separated compounds then flow across a suitable detector such as a thermal conductivity detector (TCD) that determines the concentration of each compound represented in the overall sample.

Knowing the concentration of the individual compounds makes it possible to calculate certain physical properties such as BTU or specific gravity using industry-standard equations.

This information is then transmitted to other devices such as a flow computer and/or a SCADA system.



Superior Performance and Reliability

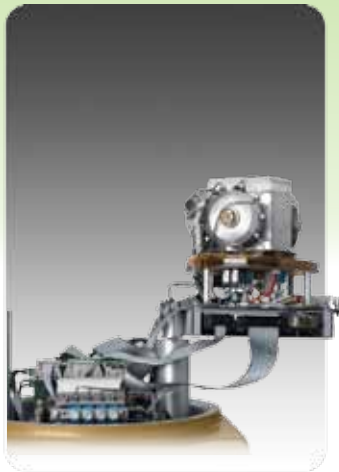
Model 700 Gas Chromatograph

Daniel's Model 700 gas chromatographs offer a broad range of analysis options in a field-mounted gas chromatograph. Whether your needs encompass energy measurement (to C₆+ and C₉+), gas quality analysis, hydrocarbon dewpoint monitoring, or a custom application, Daniel's Model 700 is flexible enough to meet your specifications.



Field-mounted performance at its best

The Model 700 is a powerful, field-mounted gas chromatograph that offers the flexibility to handle complex applications. Its rugged design offers superior reliability and precision, lower installation and operating costs, greater application flexibility, and unmatched measurement performance. Based on the same proven technology and software as the Model 500 series, the Model 700 interfaces with the intuitive, Windows-based MON2000 workstation software.



One package for fiscal metering or gas quality

- Custody transfer analysis from C₆+ to C₉+
- Contaminant monitoring – trace H₂S, CO₂, oxygen, etc.
- Combine measurements and reduce analysis cost
 - Oxygen (0-2%)
 - Trace H₂S (0-50 ppm)
 - CO₂ (as fast as 90 seconds)
 - Helium/hydrogen (0-10%)
 - Hydrocarbon dew point (+/- 2 °C)

Reduced installation costs

- 24 VDC power standard (120/220 VAC optional)
- Integrated controller electronics
- Pipe mounted, wall mounted, or floor mounted

Lower operation and maintenance costs

- No shelter or instrument air required
- Low helium and power consumption
- Longest GC valve and column warranties available

Unmatched measurement performance

- Highest stated precision (+/-0.125 BTU/1000 in controlled environments and +/-0.025 BTU/1000 in ambient (-30 °C to 60 °C / -20 °F to 140 °F) C₆+ analysis
- Wide dynamic range from percent to trace level components
- Reliable performance over broad ambient temperatures (-30 °C to 60 °C / -20 °F to 140 °F)

Model 500 Gas Chromatograph

Daniel offers a complete line of gas chromatographs made specifically for natural gas processing applications. The Danalyzer Model 500 offers the flexibility to handle a wide assortment of applications, including trace contaminant monitoring, pipeline integrity, and product quality/process control.



Analytical flexibility to handle a wide array of applications

Model 570/571 BTU/CV Gas Chromatograph

The Model 570 gas chromatograph and the ATEX-certified Model 571 are the ideal choices for compositional analysis of pipeline gas, including C₁-C₆+, N₂, and CO₂.

Model 590/591 Dual-Oven Gas Chromatograph

The Model 590 gas chromatograph and the ATEX-certified Model 591 utilize dual chromatography for advanced applications, providing more complete AGA 8 calculations. Typical applications include C₉+ with optional hydrocarbon dewpoint calculation and C₆+ with trace H₂S.



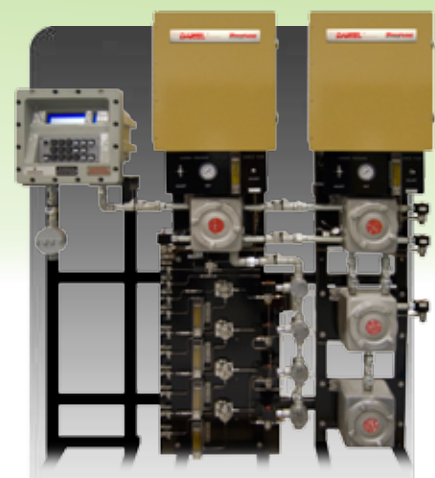
Danalyzer Model 500

- Ideal for liquid fraction facilities by being able to measure liquid and gas samples in one analyzer
- Each analyzer, including the sample handling system, is custom engineered for each application
- Ideal due to its large ambient temperature specification of 0° and 130 °F (-18° and 54 °C), the cost of an expensive analyzer shelter can often be eliminated



Danalyzer Model 570/571

- Offers a complete compositional analysis of pipeline gas (C₁-C₆+, N₂, and CO₂) and calculates the heating value, compressibility, and other gas properties
- Extremely high precision of analysis (+/-0.025% BTU over complete temperature range and +/-0.020% BTU when installed in a temperature-controlled environment)



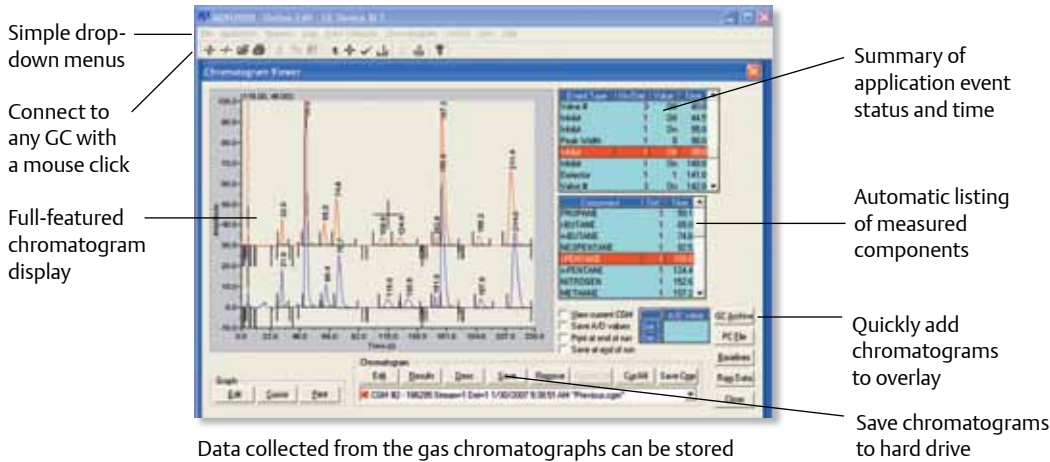
Danalyzer Model 590/591

- Ideal measurement solution for compositional analysis of rich pipeline-quality gas for better accountability of the heavier components
- Supports a more complete AGA8 calculation, as well as provides an optional hydrocarbon dew point calculation
- When doing a C₆+ analysis, the Model 590/591 can also measure 0-50 ppm H₂S in the same analyzer

Intuitive Tools

MON2000™ Gas Chromatograph Software

MON2000 Gas Chromatograph software is used with Danalyzer gas chromatographs. As a leading worldwide supplier of online gas chromatographs, Daniel has designed the software used in Danalyzer gas chromatographs to have the flexibility, calculation power, and data security to handle the precise component identification, as well as strict adherence to industry-standard calculations that fiscal and gas quality measurements demand.



Data collected from the gas chromatographs can be stored and displayed in a wide range of options, such as trend lines on the screen and logs automatically documenting all changes made to the gas chromatograph.

MON2000 offers a wide range of capabilities:

- Review and modify analytical settings
- Upload and display multiple chromatograms on the screen for comparison and troubleshooting
- Upload and trend any of the measured results
- Export data for use in third-party applications
- Check original calibration against the last calibration

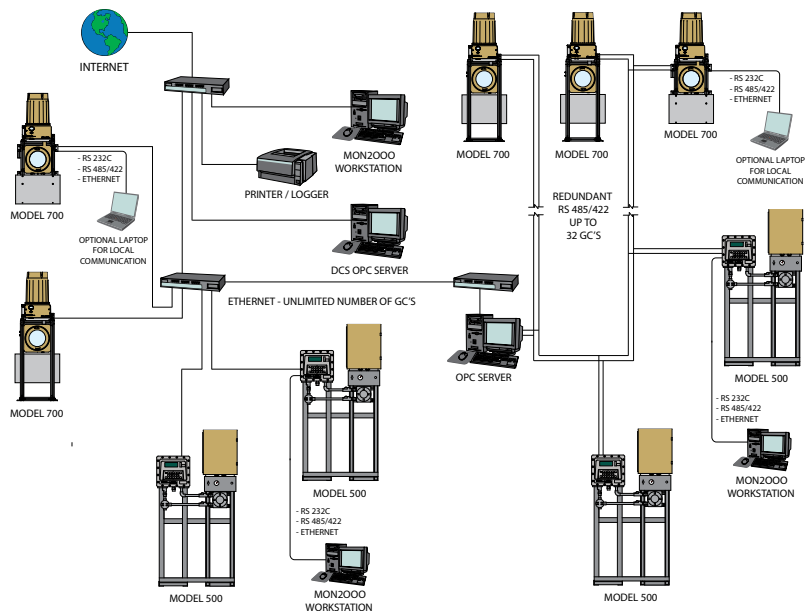
Analyzer Networking & Data Communication

Danalyzer gas chromatographs offer a wide range of communication options to meet your specific needs. Options include telephone modems, serial connections (RS-232, 422, and 485), Ethernet networks, and multi-drop RS-485 networks. Data communication options to the plant DCS include simple analog and discrete signals, as well as Modbus serial links.

Networking Flexibility

Whether you want to network gas chromatographs throughout the plant or simply link a single gas chromatograph to a flow computer, Danalyzers can be configured to handle almost any scenario:

- Choice of Ethernet or RS-485 network
- Ability to use the same network to connect all Danalyzer GCs
- Ability to connect multiple workstations using MON software
- Connectivity using industry-standard protocols, such as Modbus and OPC



A Wide Range of Applications Capabilities

Standard natural gas applications

We've made our most popular energy and gas quality applications standard. Applications may vary by components of interest, analysis time, reduced hardware, or improved precision.

Energy measurement (to C₆+ and C₉+)

The Danalyzer offers applications for energy measurement from C₆+ hydrocarbon ranges to C₉+ hydrocarbon ranges.

Gas quality analysis

Natural gas contaminants, such as hydrogen sulfide and oxygen, can be easily measured in the Danalyzer for online quality assurance. Contaminant monitoring can be combined with energy measurements for complete custody transfer analysis.

Hydrocarbon dew point monitoring

Accurate and reliable hydrocarbon dew point determination can now be made as an option to any C₉+ extended analysis application.

Custom applications

If the applications listed above do not fit your unique needs, the Danalyzer can be customized to meet many measurement requirements. Contact your sales representative for more information.

Measurement Range of a C₆+ Danalyzer

The standard Danalyzer is designed to measure the following components over the measurement range shown:

Component	Mole %
Methane	65 to 100
Ethane	0 to 20
Propane	0 to 10
N-Butane	0 to 5
Iso-Butane	0 to 5
N-Pentane	0 to 1
Iso-Pentane	0 to 1
Neo-Pentane	0 to 1
Hexane+	0 to 0.7
Nitrogen	0 to 20
Carbon Dioxide	0 to 20

Measurement Range of a C₉+ Danalyzer

The ranges of measurement remain the same as the C₁ to C₆+ analyzer with the exception of:

Component	Mole %
Hexanes	0 to 1
Heptanes	0 to 1
Octanes	0 to 0.5
Nonane+	0 to 0.5

In addition to standard applications such as C₁ to C₆+ with N₂ and CO₂ with a four-minute-analysis cycle time and C₁ to C₉+ with N₂ and CO₂ with a five-minute-analysis cycle time, a number of other standard applications are available, including high CO₂ and natural gas liquids (NGL). See your local account representative for details.

Committed to Excellent Service

Service and support

Every Danalyzer gas chromatograph is backed by an array of service and support options that ensure your unit continues to perform to precise specifications. For every new system, we offer on-site training conducted by our GC experts, so your operators, engineers, and technicians have the skills and knowledge they need to keep your system operating at peak performance.

Daniel Measurement Services provides on-call field service and around-the-clock customer service for customers who need assistance with:

- Startup and commissioning
- Product upgrades
- Product repair
- Maintenance contracts
- Education services
- Remote diagnostics



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